Quality of Instant Logistics Service under the New Retail Model Based on SERVQUAL and LSQ Model Evaluation Research

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Abstract: The success of the new retail model depends on the quality of logistics service, because it plays a vital role in the customer's shopping experience. Improving the distribution service quality of instant logistics has become the key to improve the competitiveness of new retail enterprises. Based on the SERQUAL model and the LSQ model, this paper studies the influencing factors of the instant logistics service quality, mainly using the literature survey method, questionnaire survey method and data analysis method. Five dimensions of reliability, responsiveness, convenience, economy and intelligence are selected, and the influencing factor model of logistics service quality under the new retail model is constructed, and the content of the index system is put forward. On the basis of referring to the mature scale, the questionnaire was designed and distributed, the questionnaire data and model model were tested using SPSS software, and a scientific and reasonable evaluation conclusion was drawn.

1. Introduction

New retail is a retail model that upgrades and transforms the production, circulation and sales process of commodities, and deeply integrates online and offline services, offline experience and modern logistics. New retail not only participates in mass consumption scenes such as catering, fresh food, FMCG and 3C, but also serves special consumption scenes such as medicine, flowers, luxury goods, business errands and clothing. New retail pays more attention to the terminal distribution capacity of the enterprise, and instant logistics is just in line with the customers' demands for convenience and differentiated experience, helping to realize the reconstruction of people, goods and market. Instant logistics refers to the logistics service form that, through the use of modern logistics technology and information technology, realize the whole process tracking and real-time scheduling of logistics transportation, warehousing, distribution and other links, so as to quickly and efficiently realize the delivery of goods. With the development of new retail, the social demand for instant logistics will further increase [1]. As an important support for the development of new retail, the service quality of instant logistics, as an external influencing factor, has a great

impact on consumers in terms of shopping experience. Therefore, it is of great practical significance to study the service quality evaluation system of new retail instant logistics and then optimize the service quality of instant logistics.

2. Review of the Research Status of Instant Logistics Service Quality Evaluation

At present, there are many researches on the dimensions of service quality evaluation at home and abroad, and the most representative one is Parasuraman(1988) 's research focusing on the evaluation of perceived service quality [2]. It puts forward SERQUAL model, which mainly includes five dimensions of tangibility, security, reliability, empathy and responsiveness and 22 indicators, which solves the problem of service quality evaluation well. It has also become an important watershed of service quality measurement research. As for the quality of logistics service, Mentzer (1989) [3] studied the literature on logistics service in the past, extracted three dimensions, availability, timing and quality, as indicators to measure the quality of physical distribution service, and put forward a customer-oriented LSQ scale based on the time process of logistics service. They conducted an empirical study from the perspective of customer satisfaction, and summarized nine indicators of logistics service quality from the perspective of customers (personnel communication quality, order release quantity, information quality and accuracy of goods in the ordering process, goods integrity, goods quality, error processing, and time). This is a relatively complete study on logistics service quality based on customer satisfaction. However, a careful analysis of MENTZER's LSQ model shows that the index system focuses on the evaluation of "technical quality" of logistics, and ignores the process and timing of logistics services. Although the academic community has carried out relevant research on the quality of logistics service, there are few studies on the quality of real-time logistics service of new retail, especially the theoretical research on the evaluation model of the service quality of instant logistics enterprises, as well as the research depth of dimension selection and evaluation methods.

Scholar Carman, in 1990[4], pointed out that when evaluating the service industry, different service industry backgrounds must be taken into account, and the different dimensions and importance of service quality dimensions, the dimensions and measurement projects should be deleted and added according to the characteristics of different service industries. Rafele (2004) [5] believes that the dimension of delivery time is very important in logistics service quality evaluation but is less used. Rahman (2009) [6] also reached a similar conclusion that in logistics service quality, delivery time is the most important. Chen Mingliang et al. (2009) [7] through the empirical analysis of cigarette logistics service quality, extracted the five dimensions of assurance, tangible, reliability, responsiveness, care and cost, among which mainly added the cost dimension. Han Shuguang et al. (2016) [8] analyzed the service quality of fresh logistics through the four aspects of convenience, professionalism, guarantee and reliability. Xie Guangying et al. (2016) [9] builds a conceptual model of online shopping service quality based on seven dimensions such as portability, reliability and empathy. Guo Yanyan (2020) [10] conducted a study on the logistics services provided by Jingdong Mall, and found that consumers are most interested in factors such as packaging integrity, personnel communication quality, overall corporate image and after-sales service.

To sum up, for different industries and different enterprises, the dimensions and indicators of logistics service quality evaluation are not exactly the same. The differences in the dimensions of logistics service quality evaluation of different industries and enterprises also reflect the diversity of logistics service quality research [11]. Therefore, on the basis of relevant models and based on the characteristics of logistics distribution service under the new retail model, this paper combines the five dimensions of SERQUAL model with the specific indicators of LSQ model to build a relatively perfect influencing factor model of instant logistics service quality under the new retail model to

determine the evaluation dimension of instant service quality.

3. Construction of Instant Logistics Service Quality Evaluation Scale

Based on SERVQUAL and LSQ models, which are representative of service quality evaluation, and on the basis of a large number of domestic and foreign literature analysis, this study finally sorted out 19 measurement items related to service quality evaluation of instant logistics enterprises through interviews with relevant personnel of Jingdong, Meituan, Maidelong, Yonghui Supermarket, Guiyang and other supermarkets, and listened to the opinions of relevant experts in universities. That is, the secondary evaluation index; Determine the contents of the open questionnaire index system.

Table 1: New retail instant logistics service quality evaluation scale

dimensions	number	Question item	1	2	3	4	5
Reliability	A1	The goods are professionally packaged during transportation					
	A2	The goods were not damaged during the transportation process					
	A3	The actual delivery time is the same as the expected delivery time					
	A4	Businesses choose reliable, high-quality logistics service companies					
Responsiveness	B1	Businesses provide 24 / 7 and timely customer service					
	B2	When problems in the way of flow distribution, merchants immediately provide effective solutions					
	B3	Can timely and accurately understand the demands of customers					
	B4	Inform the preferential information in advance to avoid the damage to customers' rights and interests					
Convenience	C1	The distribution range coverage degree is very high					
	C2	Provide a flexible delivery time					
	C3	Provide a variety of receiving methods					
	C4	Provide convenient return and exchange methods such as door-to-door products					
	C5	Provide personalized services according to the needs					
Economy	D1	Whether each channel freight is consistent					
	D2	Feel reasonable to return and exchange logistics costs					
	D3	The threshold of free shipping is set up reasonable					
Intelligence	E1	Online and offline synergy from purchase to return and exchange					
	E2	Courists use intelligent terminal equipment when receiving and sending express delivery					
	E3	Inform customers of the specific delivery information through intelligent voice or intelligent SMS before delivery					

4. Construction of instant logistics service quality evaluation model

The weight evaluation of service quality is a difficult problem, and the key to build the evaluation system of real-time logistics service enterprises is to choose the evaluation index. According to the content of the measurement items, five dimensions of reliability, responsiveness,

convenience, economy and intelligence are constructed. They mainly measure the expectation of the items of the respondents. Through the difference between expectation and perception, the difference value of service quality is obtained:

(1)Visibility index is by the LSQ model of goods integrity, dimension extraction, unlike SERVQUAL model tangible, instant delivery items such as fresh food, medicine, flowers, etc., in order to make customers receive intact goods, need to use more professional packaging, but also avoid distribution products suffer violence. Therefore, the index of packaging integrity was added.

(2)Responsiveness refers to the ability of service-providing enterprises to timely respond to customer services, such as the response speed of orders, the timeliness of logistics information, the timeliness of customer service response, and the speed of return and exchange for customers. The responsiveness index in SERVQUAL model is retained, and the ordering process and temporality of LSQ model are introduced. Responveness is not only to respond to services requested by customers, but also to provide services to customers.

(3)Convenience refers to the degree of distribution coverage, a flexible delivery time, a variety of receiving methods, a variety of payment methods, and a convenient return and exchange process, so that customers can feel comfortable and convenient in the process of shopping. The index of convenience depends on the change of empathy in the SERVQUAL model.

(4)Economy refers to the consumer is very sensitive to price changes, the price often determines the consumers will choose what channels to buy goods, under the new retail mode of various purchase channels, consumers tend to compare the commodity itself and logistics costs, select one of the most economical channels to buy. Yang Yue et al. (2022) [12], Zhai Xiaoke et al. (2019) [13] also believed that the economy has a great impact on the quality of logistics service in their related research on the logistics service quality.

(5)Under the new retail model, customer needs are diverse, and presents the trend of niche, fragmentation and easy to change. At the same time, the comprehensive application of a variety of intelligent technologies also promotes the development of logistics to the direction of intelligence. The use of intelligent terminal equipment makes logistics distribution and processing more convenient. The randomness of offline and online purchase and return provided based on intelligent technology also deepens the new retail shopping experience and customers' satisfaction with logistics services, so the dimension of "intelligence" is added.

The gradual analysis of the instant logistics delivery service quality based on the SERVQUAL model and the LSQ model constitutes an evaluation system of the terminal distribution service quality of fresh e-commerce companies under the new retail background, as shown in Table 1. Combined with the evaluation system of service quality of fresh electricity terminal distribution proposed by Tian Yichen et al. (2021) [14], the evaluation model of service quality of instant logistics service under the new retail background is constructed, as shown in Figure 1.
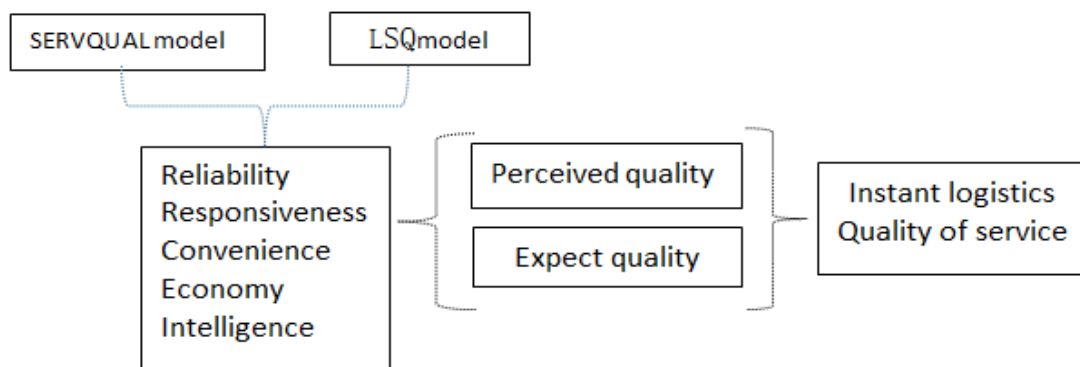

Figure 1: Theoretical model of service quality evaluation of new retail instant logistics

5. Reliability and Validity Test of the Evaluation Scale

5.1 Descriptive Analysis of the Samples

Based on the basic assumptions of the influencing factor model of instant logistics service quality under the new retail model, the design of the survey questionnaire is for the people who have purchased goods or services in the new retail platform and the staff working in the new retail enterprise. The questionnaire consists of three parts: Part 1 introduces the basic information of the questionnaire; Part 2 determines the real identity of the subjects by understanding the general information of the respondents, including gender, age, occupation, education level and economic status; Part 3 is the questionnaire about consumer perception of the quality of instant logistics service. Based on the sample data obtained from the questionnaire survey, the reliability and validity of the logistics service quality influencing factor model can be tested constructed above. A total of 19 questions are designed, which are measured by Likert's 5-level scale. On each question, consumers can score each question in order of one to five in accordance with the importance of each factor in their mind. Options from left to right indicate "very unimportant" to "very important" attitudes. This survey collected questionnaires mainly through online questionnaire links. A total of 431 questionnaires were collected, among which 397 were valid, with an effective rate of 90%. In order to better ensure the authenticity of the data, this questionnaire uses an anonymous way to answer the questions and protect the personal information and privacy of the participants, so that the respondents can answer the questions with ease. From the descriptive statistical analysis of the survey respondents, the survey respondents are reliable and real. The questionnaire of this study was also representative and available for subsequent studies [15].

5.2 Confidence Analysis of the Samples

The reliability of the questionnaire refers to the credibility of the results of the questionnaire, that is, how consistent the results are if the questionnaire is reused. Reliability analysis is a method that can be used to test the consistency and stability of the questionnaire data. By summarizing the relevant studies of experts and scholars, the two variables, the clonal Bach coefficient and the overall correlation coefficient, are selected to reflect the reliability characteristics. The clonal Bach coefficient is used to reflect the degree of internal consistency of the questionnaire data. According to scholar Devellis (1991), 0.65-0.70 is the minimum acceptable value, 0.7-0.8 is quite good, and 0.8-0.9 is very good. If the coefficient of the subscale is lower than 0.65 or the reliability coefficient of the total scale is below 0.8, a revised scale should be considered. On the other hand, the overall correlation coefficient of the project reflects the correlation degree of each index. It is generally believed that this index should be removed when the overall correlation coefficient is less than 0.4. Using the reliability analysis module of SPSS26, we analyzed the sample data as follows: Table 2.

As can be seen from Table 2, the clonal Bach coefficient of the five dimensions are 0.797,0.827,0.864,0.895 and 0.791 respectively, all above 0.7, indicating very high internal consistency, which shows that the reliability of the whole scale is good.

5.3 Validity analysis of the samples

Validity analysis is the degree to which it reflects the true differences in the measured properties between objects as reflected by the differences between observed values. Because this study analyzed a large number of domestic and foreign related literature, and adopted expert opinion method, KMO test and Bartlett sphere test.

Table 2: Reliability test

Variable name	Measure the item	Total correlation of the correction items	Cronbach's α
Reliability	A1	0.544	0.797
	A2	0.661	
	A3	0.557	
	A4	0.685	
Responsiveness	B1	0.637	0.827
	B2	0.545	
	B3	0.621	
	B4	0.687	
Convenience	C1	0.639	0.864
	C2	0.592	
	C3	0.686	
	C4	0.589	
	C5	0.633	
Economy	D1	0.664	0.895
	D2	0.580	
	D3	0.673	
Intelligence	E1	0.606	0.791
	E2	0.614	
	E3	0.575	

(1) KOM test and Bartlett sphere test

The KMO test is a statistical method used to assess the feasibility of a factor analysis. It can measure the adequacy of the sample, and is able to reflect the degree of correlation between the variables by comparing the simple and partial correlation coefficients between all the variables. The value of KMO is generally between 0 and 1, and the closer to 1, the more suitable for factor analysis. Generally, the factor analysis can be performed when the KMO value is greater than 0.6, but when the KMO value is less than 0.6, it is no longer suitable for further factor analysis. In practice, the KMO test is usually used as a pre-processing step for factor analysis to ensure that the number of the factors selected is reasonable and that the selected factors have high explanatory power.

Bartlett Spherical test was used to test for independence between variables. This test method can determine whether the dataset has a spherical structure, and can also be used to determine whether the factor analysis model applies to the dataset. Before factor analysis, we usually use Bartlett spherical test to determine whether the data set is suitable for factor analysis, specifically, when the chi-square value of Bartlett is larger and the corresponding p-value is less than the significance level, the difference between the covariance matrix and the unit matrix is more significant, which is more suitable for factor analysis. At this time, potential factors can be identified and extracted in the dataset to better understand and explain the relationship between variables in the dataset.

Using the factor analysis module of SPSS26 software, perform the validity analysis of the sample data, the structure is as follows in Table 3:

Table 3: KMO and Bartlett tests

Number of KMO sampling suitability quantities Tet spherical test	0.856
approximate chi-square	4628.424
Variance	241
conspicuousness	0.000

The KMO value of the questionnaire data in this paper was 0.856, indicating its suitability for

factor analysis. Bartlett The sphericity test is to determine whether the data is generated from the normally distributed data population. Its value is 4628.424, and in this example, the Sig value is 0.000, indicating that the data conforms to the characteristics of normal distribution, has correlation, and is suitable for factor analysis.

(2) Cumulative interpretation of the variation results

The magnitude of the variance contribution of the common factor in the measurement can reflect the conceived validity of the measurement. Factor analysis is conducted by principal component analysis. The factor is selected according to whether the feature value is greater than 1, and if it is greater than 1, it is retained by the SPSS software, as shown in Table 4. In column 2, the characteristic root of the top 6 factors is greater than 1, and 6 factors are extracted. The cumulative variance contribution of these 6 factors is 66.926%, which is greater than 60%. The analysis results are ideal and consistent with the original idea.

Table 4: Cumulative interpretation of variation results

ingredient	Initial eigenvalue			Extract the squared sum and load		
	summation	variance%	grand total%	summation	variance%	grand total%
1	7.623	34.682	34.671	7.628	34.652	34.572
2	1.344	7.916	42.558	1.744	7.926	42.598
3	1.642	7.374	49.932	1.622	7.374	49.972
4	1.361	6. 174	56. 157	1.381	6. 114	56. 147
5	1.239	5.631	61.788	1.239	5.631	61.231
6	1. 134	5. 155	66.952	1. 134	5. 155	66.926
7	0.704	3.201	70. 143			
8	0.677	3.077	73.230			
9	0.643	2.921	76. 142			
10	0.585	2.659	78.800			
11	0.558	2.446	81.256			
12	0.467	2.249	83.495			
13	0.446	2. 164	85.859			
14	0.425	2.069	87.728			
15	0.422	1.920	89.648			
16	0.338	1.808	91.466			
17	0.316	1.664	93. 120			
18	0.301	1.489	92.649			
19	0.313	1.460	93.047			

6. Conclusions

Based on the literature review of service quality theory, this paper constructs a theoretical model for measuring real-time logistics enterprise service quality evaluation based on SERVQUAL and LSQ models. The quality assurance evaluation system is composed of 19 indexes from five dimensions: reliability, responsiveness, convenience, economy and intelligence. The empirical study shows that the evaluation scale has good reliability and validity, and can evaluate the instant distribution logistics enterprises. The evaluation conclusion is scientific and reasonable.

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